wherein the dispersing and mitigating layer is a substance having a plurality of rigid metallic particles or ceramic particles;

wherein the substance excluding alumina has a specific gravity ranging from 4.0 to 12; and

wherein the packed bed is provided in a wet-oxidation treatment unit.

30. (Amended.) An apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water comprising:

a packed bed of the solid catalyst and/or the solid adsorbent;

a water-permeable pressure layer having a load which can suppress a deformation of the packed bed of the solid catalyst and/or the solid adsorbent; and

a layer configured to disperse and mitigate an upward stream of the waste water or a waste gas, said layer being provided under the packed bed;

wherein the pressure layer is provided on the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the dispersing and mitigating layer is a plurality of rigid metallic particles or ceramic particles; and

wherein the substance excluding alumina has a specific gravity ranging from 4.0 to 12.

REMARKS

Favorable consideration of this new continuation application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 2, 6-10, 13-15 and 19-38 are currently pending in this application. By this Preliminary Amendment, the applicants cancel Claims 1, 2, 13, 20-22, 24, 25, 28 and 31-38;

amend Claims 6, 8-10, 14, 15, 23, 27 and 30; and leave Claims 7, 19, 26 and 29 unamended. Thus, 13 claims, including five independent Claims 6, 15, 23, 27 and 30, are in this new continuation application for reconsideration.

In the outstanding Office Action, Claims 1, 2, 8-10 and 28 were rejected under 35 U.S.C. §103(a) for obviousness over the U.S. Patent of Gentry in view of European Patent Application No. 0 636 399; Claims 6, 7, 23, 26, 29 and 31-38 were rejected under 35 U.S.C. §112, second paragraph, for indefiniteness; Claims 6, 7, 23, 26 and 29 were rejected under 35 U.S.C. §103(a) for obviousness over the U.S. Patent of Gentry in view of either the U.S. Patent of Beck et al. or the U.S. Patent of Takagi et al.; Claims 13, 15 and 30 were rejected under 35 U.S.C. §102(e) for anticipation by the U.S. Patent of Gentry; Claims 14 and 19 were rejected under 35 U.S.C. §103(a) for obviousness over the U.S. Patent of Gentry; Claims 20 and 27 were rejected under 35 U.S.C. §103(a) for obviousness over WO 96/13463 in view of the U.S. Patent of Gentry; Claims 21, 22, 24 and 25 were rejected under 35 U.S.C. §103(a) for obviousness over WO 96/13463 in view of the U.S. Patent of Gentry, taken further in view of European Patent Application No. 0 636 399; Claims 31-34, 37 and 38 were rejected under 35 U.S.C. §103(a) for obviousness over the U.S. Patent of Gentry in view of the U.S. Patent of Campbell et al.; and Claims 35 and 36 were rejected under 35 U.S.C. §103(a) for obviousness over WO 96/13463 and the U.S. Patent of Gentry, taken further in view of the U.S. Patent of Campbell et al.

The rejection of Claims 1, 2, 8-10 and 28 under 35 U.S.C. §103(a) for obviousness over Gentry in view of European Patent Application No. 0 636 399 is now moot due to the cancellation of Claims 1, 2 and 28 and the change in dependency of Claims 8-10 from canceled Claims 1 and 2 to amended independent Claim 6.

The rejection of Claims 6, 7, 23, 26, 29 and 31-38 under 35 U.S.C. §112, second paragraph, for indefiniteness, is hereby overcome by deleting the dimensions given for the

dimensionless variable of specific gravity from independent Claims 6 and 23 and by the cancellation of Claims 31-38. Therefore, withdrawal of the rejection of remaining Claims 6, 7, 23, 26 and 29 under 35 U.S.C. §112, second paragraph, for indefiniteness is respectfully requested.

The rejection of Claims 21, 22, 24 and 25 under 35 U.S.C. §103(a) for obviousness over WO 96/13463 in view of the U.S. Patent of Gentry, taken further in view of European Patent Application No. 0 636 399, is now moot due to the cancellation of such Claims 21, 22, 24 and 25.

Likewise, the rejection of Claims 31-34, 37 and 38 under 35 U.S.C. §103(a) for obviousness over the U.S. Patent of Gentry in view of the U.S. Patent of Campbell et al. is now moot due to the cancellation of such Claims 31-34, 37 and 38.

Similarly, the rejection of Claims 35 and 36 under 35 U.S.C. §103(a) for obviousness over WO 96/13463 and the U.S. Patent of Gentry, taken further in view of the U.S. Patent of Campbell et al., is also moot due to the cancellation of such Claims 35 and 36.

In view of the cancellation of Claims 13 and 20, the remaining rejections are the following: Claims 6, 7, 23, 26 and 29 for obviousness over Gentry in view of either Beck et al. or Takagi et al.; Claims 14 and 19 for obviousness over Gentry; Claims 15 and 30 for anticipation by Gentry; and Claim 27 for obviousness over WO 96/13463 in view of Gentry. In all of these rejections, Gentry is cited as either the sole, primary, or secondary reference rendering the remaining claims either anticipated or obvious. Therefore, the following remarks are focused upon Gentry so as to remove this reference as a proper citation.

The present invention differs from the prior art apparatus of Gentry in terms of the kind of substance constituting the water permeable pressure layer. The water permeable pressure layer in the present invention is specifically defined as having a load sufficient to suppress

substantially a movement of the solid catalyst while securing flexibility to follow up the movement of the solid catalyst packed bed, as well as having water permeability. For this purpose, metal or ceramic particles having a specific gravity ranging from 4.0 to 12 are preferably used in the present invention as the granular substance constituting the water permeable pressure layer. See page 23 at line 13 of the specification. If the specific gravity is too low, sufficient pressure cannot be given to the solid catalyst packed bed in the present invention. See page 23 at lines 14 and 15 of the specification.

On the other hand, the prior art apparatus of Gentry uses alumina balls which have a specific gravity of less than 4. According to the Handbook of Chemistry & Physics, alumina which is aluminum oxide having a formula Al_2O_3 has a specific gravity ranging from 3.5 to 3.9. Using alumina balls having such a low specific gravity results in the failure of the water permeable pressure layer of Gentry to exert a load which is sufficient to suppress movement of the solid catalyst packed bed. Thus, the prior art apparatus of Gentry fails to provide the aforementioned desired effect obtained by the water permeable pressure layer of the present invention.

Furthermore, Gentry intends to provide solely a catalyst device capable of efficiently carrying out a chemical reaction. Gentry neither had the idea nor the intent to prevent effectively the abrasion of the solid catalyst. Accordingly, it is the position of the applicants that Gentry neither discloses nor suggests using a granular substance having a heavy specific gravity to prevent the movement of the solid catalyst packed layer so as to eliminate abrasion of the solid catalyst.

Therefore, these differences between the present invention and the teachings of Gentry are such that the present invention as a whole is neither anticipated nor rendered obvious by the prior art device of Gentry.

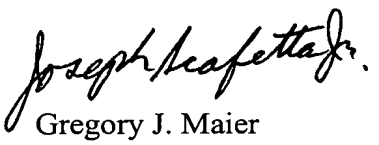
Thus, careful reconsideration and withdrawal of the various rejections of the remaining Claims 6-10, 14, 15, 19, 23, 26, 27, 29 and 30 for either anticipation or obviousness over Gentry, when considered either alone or in proper combination with the other cited references are earnestly solicited.

Based upon the above discussion, it is respectfully submitted that amended independent Claims 6, 15, 23, 27 and 30 are patentably distinguishable over Gentry considered alone or with other applied references. Likewise, the remaining dependent Claims 7-10, 14, 19, 26 and 29 are similarly patentably distinguishable thereover.

Consequently, in view of the foregoing amendments and remarks, no further issues are believed to be outstanding and the present application should be considered in condition for formal allowance. Therefore, a quick and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Registration No. 25,599
Attorney of Record
Joseph Scafetta, Jr.
Registration No. 26,803

22850

(703) 413-3000
Fax (703) 413-2220
GJM:JAS:eac

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IN THE CLAIMS

1. (Cancel.)

2. (Cancel.)

6. (Four Times Amended.) An apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water, comprising:

a packed bed of the solid catalyst and/or the solid adsorbent; and

a water-permeable pressure layer having a load which can suppress a deformation of the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the water-permeable pressure layer is provided on the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the water-permeable pressure layer is a substance having a plurality of rigid metal particles or ceramic particles; and

wherein the substance excluding alumina has a specific gravity ranging from 4.0 to 12 [g/cm^{3}].

8. (Thrice Amended.) The apparatus according to claim [1 or 2] 6, wherein the respective segments formed by the vertical partition have a cross-sectional area of 50 to 5000 cm^{2}.

9. (Thrice Amended) The apparatus according to claim [1 or 2] 6, wherein the vertical partition has a height of 20 to 300 cm in the vertical direction.

10. (Thrice Amended.) An apparatus according to claim [1] 6, further comprising:

a layer configured to disperse and mitigate an upward stream of the waste water and/or a waste gas, said layer being provided under the packed bed.

13. (Cancel.)

14. (Thrice Amended.) An apparatus according to claim [13 or] 30, wherein each one of the rigid metallic particles or ceramic particles has an average diameter of 3 to 30 mm.

15. (Thrice Amended.) An apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water, comprising:

a packed bed of the solid catalyst and/or the solid adsorbent; and

a layer configured to disperse and mitigate an upward stream of the waste water and/or a waste gas;

wherein the dispersing and mitigating layer is provided under the packed bed of the solid catalyst and/or the solid adsorbent; [and]

wherein the dispersing and mitigating layer is a substance having a plurality of rigid metallic particles or ceramic particles; and

wherein the substance excluding alumina has a specific gravity ranging from 4.0 to 12.

20. (Cancel.)

21. (Cancel.)

22. (Cancel.)

23. (Twice Amended.) An apparatus for prevent abrasion of a solid catalyst and/or a solid adsorbent while treating waste water, comprising:

a packed bed of the solid catalyst and/or the solid adsorbent; and

a water-permeable pressure layer having a load which can suppress a deformation of the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the water-permeable pressure layer is provided on the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the water-permeable pressure layer is a substance having a plurality of rigid metal particles or ceramic particles; [and]

wherein the substance excluding alumina has a specific gravity ranging from 4.0 to 12 [g/cm^3]; and

wherein the packed bed is provided in a wet-oxidation treatment unit.

24. (Cancel.)

25. (Cancel.)

27. (Amended.) An apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water, comprising:

a packed bed of the solid catalyst and/or the solid adsorbent; and

a layer configured to disperse and mitigate an upward stream of the waste water and/or a waste gas;

wherein the dispersing and mitigating layer is provided under the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the dispersing and mitigating layer is a substance having a plurality of rigid metallic particles or ceramic particles; [and]

wherein the substance excluding alumina has a specific gravity ranging from 4.0 to 12; and

wherein the packed bed is provided in a wet-oxidation treatment unit.

28. (Cancel.)

30. (Amended.) An apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water comprising:

a packed bed of the solid catalyst and/or the solid adsorbent;

a water-permeable pressure layer having a load which can suppress a deformation of the packed bed of the solid catalyst and/or the solid adsorbent; and

a layer configured to disperse and mitigate an upward stream of the waste water or a waste gas, said layer being provided under the packed bed;

wherein the pressure layer is provided on the packed bed of the solid catalyst and/or the solid adsorbent; [and]

wherein the dispersing and mitigating layer is a plurality of rigid metallic particles or ceramic particles; and

wherein the substance excluding alumina has a specific gravity ranging from 4.0 to 12.

31. (Cancel.)

32. (Cancel.)

33. (Cancel.)

34. (Cancel.)

35. (Cancel.)

36. (Cancel.)

37. (Cancel.)

38. (Cancel.)